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§ 21. Notes on the Anthocerotaceæ of North America, with Descriptions of Several New Species, by C. F. AUSTIN.

[Names preceded by an asterisk (\*) are provisional; being introduced, along with the others, for the purpose of calling the attention of collectors more directly to this most obscure family of Hepaticæ; in the hope that it may lead to the collecting of more and generally better specimens; since it is absolutely impossible to come to any satisfactory conclusion concerning the species and forms that exist in this country, with the small amount of material now on hand.]

ANTHOCEROTACEÆ, Lindb. in litt.

*Anthocerotaceæ*, Nees.

Capsule dorsal, pod-like, mostly erect and bivalved, usually with stomata in its outer wall, with a filiform columella, tapering into a pedicel or often sessile, with a bulbous base. Involucre tubular. Perianth none. Calyptra rupturing early near the base and carried up on the apex of the capsule, crowned with a subsessile stigma. Spores flattish, more or less convexo-prismatic, either papillose or smooth. Elaters present, with or without fibres. Vegetation frondose; texture flaccid and more or less vesiculose. Epidermis and pores none.

The family comprises three genera\*; viz., *Dendroceros*, *Blanfordia* and *Anthoceros*. So far as is known only the last one named occurs within our limits. The other two are tropical; however, *Dendroceros* may be looked for in the States bordering on the Gulf of Mexico.

ANTHOCEROS, Linn.

Fronds dark green or blackish, usually depressed, variously lobed and divided, of a peculiar lax and vesiculose texture, with a large green grain (chlorophyl) in each cell, and often with small blackish tubers or gemmæ in its substance, frequently glandularly thickened at the apex of the lobes, or in streaks along their middle (in the latter case the fronds are falsely nerved). Capsule linear or cylindrico-oblong, 2-valved. Spores papillose or smooth, colored. Elaters in our species simple or branched, often geniculate, more or less heteromorphous, either destitute of fibres, or very imperfectly and obscurely fibrillose; (in some foreign species furnished with a single broad spiral band.

§ *Spores yellow: elaters usually also yellow, or with a yellowish tinge.*

1. *Anthoceros lævis*, Linn.—Frond smooth and nearly plane above. Involucre 1–2 lines high, trumpet-shaped when dry, the mouth repand-toothed, often thickened, rarely scarious. Capsule pale brown or yellowish, 1–1½ inches high; the valves often much twisted in drying. Spores rather small, nearly smooth, flattish, angular. Elaters yellowish, slender, variable in length, but always rather short, geniculate, flattish, often branched and somewhat articulated.—*A. flexivalvis*, L. & Ig.

Var. major, Aust. Hepat. Exsic. n. 123<sup>b</sup>.—*A. Carolinianus*, Mx.—

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\* *Notothylas*, Sulliv., comprises a few species which have all the essential characters of *Anthoceros*, but some of them in a reduced degree. The characters upon which the genus is founded appear to be wholly *gradat*. It may possibly rank as a sub genus, provided a distinct line of division can be drawn between it and *Anthoceros* proper.

*A. Carolinianus* and *A. laciniatus*, Schweinitz. Differs chiefly in being larger in all its parts.

Canada to the Gulf of Mexico and California; the var. in the South and in California.

2. \* *Anthoceros cæspiticius*, De Not. (Syn., Hep. p. 588.)—*A. tuberosus*, Tayl. (Syn. Hep., p. 791. *A. Torreyi*, Aust. MSS.—Frond dissected to the base, the divisions narrow and variously lobed, expanded at the apex, very dark green, more or less glandular, nerved or nerveless, 2—4 lines long; sending down here and there from the nerve underneath, or from its apex, a radiculose flagellum, which terminates in a roundish tuber-like turion. Involucre broad, scarcely a line high, broadly sulcate and obtusely biangled on the back, minutely punctate; the apex sub-truncate, repand-tridentate and narrowly scarious at the mouth. Capsule thick, 5—7 lines long, sessile, sulcate or angled, the apex obtuse and subtruncate. Spores as in *A. lævis*; elaters longer than in that species. Columella thickish, fibrillose.

The above description is taken from a specimen in Herb. Torrey. under the name of "*A. lævis*, Linn.," from the Island of Corsica. But sterile fronds of the same character have frequently come to my notice, mixed with terrestrial mosses from Texas and California.

3 *Anthoceros Hallii*, n. sp.—Fronde  $\frac{1}{2}$ —1 unciam longa  $\frac{1}{2}$ —1 lineam lata cæspitosa sæpe erecta lineari vel elongato-flabelliformi, apice integro parceve lobato sæpissime glanduloso-incrassato, involucri terminali (semper?) pellucido pallido-viridi 1—1 $\frac{1}{2}$  lin. longo, apice truncato tenui integro; capsula (immatura) circa 3 lin. longa brevi pedicellata sulcata, textura crassa molli; sporis lævibus; elateribus fere ut in *A. lævi*.

Fertile plant on the ground, Silverton; sterile on dripping rocks, Salem, Oregon, *E. Hall*. Also in swamps, Marvin County, California. Bolander.

Frond albescent or ochraceous below, pale green above, or the glandularly thickened portion very dark green, composed of several thicknesses of cells; the outer layer smallish, close and quadrate, the inner layers elongated and lax. Involucre terminating the frond, and a continuation of the outer layer of cells. Gemmæ very large, fusiform. Capsule very narrow; the valves remarkably thick. Pedicel very short.

The California specimens have the fronds prostrate and entangled, irregularly dissected, plicate-costate or lamellate; the lamellæ bearing elliptical tubers underneath.

4. \* *Anthoceros Oreganus*, n. sp.—Fronde tenui hic illic glanduloso incrassata involucri perbreui, supra medium abrupte constricto et scarioso ore subtruncato leniter repando-lobato inferne inflato minute et confertim punctato, capsula sessili (basi bulbiformi) crassiuscula circa 6 lin. longa valvulis apice cohærentibus; sporis (parvis flavidis indistincte granulosis) et elateribus fere ut in *A. lævi*.

Oregon, *E. Hall*.

Capsule splitting to the mouth of the involucre. Involucre often not scarious at the mouth. A small species.

5. *Anthoceros sulcatus*, Aust.—(*Notothylas Hallii*, Aust., *MSS.*, 1874), *n. sp.*—Fronde caespitosa erecta basi attenuata flabelliformi 2—3 lineas longa saturate viridi, margine varie lobata et repanda, involucri circa  $\frac{1}{2}$  lin. longo obovato-quadrato scabriusculo, ore repando-dentato, capsula 2—2 $\frac{1}{2}$  lin. longa tenui erecta vel curviuscula sulcata fere sessili compresso-quadrangulata, textura crassa molli, collumella crassiuscula fibrosa, sporis majusculis flavidis, elateribus brevibus.

On moist earth, Salem, Oregon, *E. Hall.*

This species is evidently a connecting link between *Notothylas*, *Sulliv.*, and *Anthoceros*.

Frond apparently hollow, with a few large black tuber-like gemmæ in its substance; the apex occasionally descending and bearing a roundish tuber, the green granules in the cells larger than in *A. orbicularis*; rootlets fascicled, granulose. Involucre from the apex of the frond. Capsules (very numerous) acutely angled when dry, narrow, yellow, compressed, striate-angled, of a thick but lax texture. Pedicel very short. Spores larger and not so smooth, and elaters paler, otherwise they are much as in *A. orbicularis*. In the young state the fronds appear to be prostrate.

6. *Anthoceros (Notothylas) orbicularis*.—*Carpobolus orbicularis*, Schweinitz.—*Notothylas orbicularis* and *N. valvata*, *Sulliv.*—General appearance of the frond and spores much as in *A. laevis*. Elaters very minute, pale, nearly or quite as broad as long, very thin. Capsules more or less curved, 1—2 lines long, erect or decumbent and wholly included in the involucre or partially exerted in the same specimen, marked with a suture on each side, but often the valves do not separate spontaneously, of a thin and rather lax texture. Antheridia large, usually single immersed in cavities in the frond which have the margin slightly elevated. The fertile involucre remains closed at the apex when the capsule is included; but usually as the latter increases in size, the former becomes irregularly torn.

Canada to the Gulf of Mexico.

§ § Spores black: elaters fuscous.

7. *Anthoceros punctatus*, Linn.—Fronds small, depressed, or often caespitose and erectish, of a lax texture, more or less glandular, and often falsely nerved. Involucre rather shorter than in *A. laevis*, oblong-linear, slightly repand and sometimes scarious at the mouth. Capsule about one inch high, black. Spores smallish, strongly muriculate, sharply angled. Elaters rather short and broad, flattish, geniculate and variously contorted, somewhat articulated.

Var. *scariousus*, (*A. scariousus*, Aust. olim), has the frond and involucre lamellated, and the latter broadly scarious at the mouth.—Var. *Ohionesis*. Frond distinctly nerved; apex of the lobes much thickened and solid.—Var. *Eatoni*. Fronds caespitose and erect, crowded; involucre narrower, more or less lamellated, parallel to and more or less connate with the surface of the frond.

Canada to the Gulf of Mexico and West to Missouri.—Var. 1 in S. Car., *Ravenel*. Var. 2 in Ohio, *Lesquereux*. Var. 3 in Florida, *Eaton*.

8. *Anthoceros fusiformis*, *n. sp.*, Aust. MSS., 1866.—Differt ab *A. punctato*: statura majore, fronde magis dissecta, involuero multum altiori (2—4 lin.) subfusiformi, capsula longiori (1—2 unc.) solidiori, sporis minutius papillois, elateribus longioribus angustioribus magis opacis solidioribus.

Observation Inlet, Columbia, *Dr. Scouler* in Herb. Torrey; also in the Herb. Taylor. California, *Bolander*. Oregon, *E. Hall*.

9. *Anthoceros stomatifer*, *n. sp.*—Differt ab *A. punctato*, fronde solidiori (reti minori) in margine glanduloso-cristata, involuero longiori angustiori ex margine frondis orienti solidiori, capsula longiori gracilliori stomatifera, sporis paulum majoribus magis papillois intensius atris.

Oregon, *E. Hall*.

Fronds small, black, opaque, glanduliferous. Capsule with the long and slender valves much twisted in drying, and bearing numerous stomata in its walls.

10. *Anthoceros Ravenelii*, *n. sp.*—Fronde parva pallida tenui sublævi e cellulis parvisculis subpellucidis (granulis viridibus impletis) formata, laciniis brevibus varie repandis lobatisve, involuero brevi (circa  $\frac{3}{4}$  lin. longo) late cylindrico truncato ore anguste scarioso, capsula (vix matura) sessili circa  $\frac{1}{2}$ — $\frac{3}{4}$  unc. longa bivalva, columella crassiuscula filamentis squarrosis obsita, sporis magnis pallido-fuscis plano-convexis in circuitu rotundis minutissime granulosis obscure angularibus, elateribus minutis opacis granulosis subtriangulari-prismaticis difformibus subæque latis ac longis pallido-ochraceis.

Moist earth, South Carolina, *Ravenel* in Herb. *Sulliv.*

This species is also evidently a connecting link between this and the following genus. It is well marked by the pale color of the frond, by the large (immature) spores and by the minute subprismatic angular granulate elaters.

Columella with long jagged squarrose filaments attached to its surface, among which the elaters and spores are entangled. Cells of the frond smaller than in *A. punctatus*, the frond being more closely areolated. Involucre of a lax hyaline texture, (punctate like the frond); the cells at its base oblong, near the apex rhombic, at the mouth somewhat transversely elongated.

11. *Anthoceros Lescurii*, *n. sp.*—Fronde nigra circa  $\frac{1}{2}$  unc. longa e basi valde angustata late flabelliformi crassa opaca supra valde rugosa et lamellosa confertim papulosa planiuscula, margine crenato-cristata, involuero  $\frac{1}{4}$  ad  $\frac{3}{4}$  lin. longo, basi valde dilatato, apice subtruncato, ore subdilatato subincrassato leniter lobato, textura carnosae et crassae, capsula  $\frac{1}{4}$  ad  $\frac{3}{4}$  unc. longa crassiuscula stomatifera pedicello brevissimo inclusa, sporis aterrimis magnis plano-convexis in circuitu subrotundis (obscure angularibus) distincte papillois, elateribus brevioribus quam in *A. punctato* cæteroquin fere similibus.

“*Anthoceros lævis*, Var. *Carolinianus*, Michx. New Orleans.”  
*Herb. Lesqueræux.*

Remarkable for the thick, opaque rugose lamellated, broadly flabelliform black frond; for the much expanded base of the very

short involucre, for the large black papillose spores, and for the very short elaters.

There are mixed with and adhering more or less to the spores and elaters, a great many short geniculate slender pale jagged filaments. These are, doubtless, of the same nature as the filaments which adhere to the columella in some species (e. g., *A. Ravenelii*). Probably they are the remains of the effete *cellules matriciales*.

12. *Anthoceros Olneyi*, n. sp.—Fronde erecta sub prostratave sub-oblongo-flabelliformi varie lobata crenatave substriato-venosa opaca supra ob granulas magnas tuberculatas sub epidermide elevato-punctata (ut verruculosa videatur), involucre late cylindrico circa lineam longo leniter striato haud punctato e cellulis parvis ovali-hexagonis formato, apice truncato, ore crenato repando-dentatove subscarioso, capsulis (vix maturis)  $\frac{1}{4}$  —  $\frac{3}{4}$  unc. longis erectis, sporis nigris magnis plano-convexis in circuitu rotundis opacis minutissime papilloso-granulosis, elateribus valde compressis catenulato-articulatis (sine fibra spirali).

Florida, Dr. Chapman; communicated by Stephen T. Olney, Esq.

Remarkable for the large black globular tuberculated granules just beneath the surface of the frond, which give it a strikingly warted appearance, for the large minutely papillose spores, and for the short-jointed flat elaters. About the size of small forms of *A. punctatus*; from which it is readily distinguished by the different texture of both the frond and involucre, as well as by the much larger neither angled nor muriculate spores, and by the jointed elaters. The joints of the elaters are nearly or quite as broad as long, very flat, roundish (variable in shape and size) and placed end to end or often here and there two of them side by side. The fronds are (in my specimen) caespitose and mostly erect. The granules under the epidermis are easily separated from the frond by maceration. (*A. glandulosus*, L. & Lg., has somewhat similar granules in the upper surface of the frond, but they are much smaller, not so exactly globose, and of a pale color.)

\* 13. *Anthoceros Joorii*, n. sp. ?—Size of the plant about as in the three last described species; in texture intermediate between the first two of them. Spores and elaters much as in *A. Lescurii*, but there are no jagged filaments mixed with them as in that species, nor is the columella fibrillose as in *A. Ravenelii*. However, I am inclined to believe it will prove to be a more mature state of the last-named species.

Louisiana, Dr. Joor.

14. *Anthoceros (Notothyas) melanosporus*, *Sulliv.*—General appearance and texture of the frond much as in *A. punctatus*. Spores fuscous, smooth. Capsule, elaters, size and shape of spores about as in *A. orbicularis*.

## § 22. Notes on the Genus *Pellia*, by C F. AUSTIN.

*Pellia porphyrorrhiza*, (Nees) Aust.—*Pellia phylloloba*, Aust. MSS.—*Jungermania porphyrorrhiza*, Nees in Mart. Fl. Brazil, I., p. 343.—*Noteroclada confluens*, Tayl. Hepat. Antarct. in Lond. Jour.